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ABSTRACT

Researchers, consulting professionals, and advocating agencies agree that school facility design is one essential component to a safe and successful school. This document addresses design-related concepts that can positively affect school climate and order. It describes and provides facility planning guidelines for crime prevention through environmental control in the following areas: access control; natural surveillance; formal surveillance; territoriality; defensible space; target hardening; and program interaction. Guidelines also address issues on school size, schools-within-schools, health and life safety, and school climate and order. (Contains 30 references.) (GR)

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State Board of Education
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SAFE SCHOOLS FACILITIES PLANNER

IMPROVING SCHOOL CLIMATE AND ORDER THROUGH FACILITIES DESIGN

FOREWORD

Safety for students and staff in North Carolina's public schools is paramount to achieving the mission of the State Board of Education. The General Assembly directed the State Board to review and consider modifications to its public schools facilities guidelines, in light of research on the relationship between school size and other design components and climate and order in schools.

Research clearly indicates a significant relationship between the design of school facilities and school climate and order. Likewise, the size of a school has been shown to relate directly to safety for students and staff. This document will highlight those relationships and set forth State Board recommendations for implementing facilities design consistent with the research.

These planning guidelines, for new construction and modifications to existing facilities, supplement the *North Carolina Public Schools Facilities Guidelines*. These represent the State Board's minimum suggested guidelines for public school facilities in North Carolina. They are a resource that can assist design professionals to plan facilities which meet the evolving needs of public schools. We hope you find them useful.

Phillip J. Kirk, Jr., Chair
State Board of Education

Michael E. Ward, State Superintendent
North Carolina Department of Public Instruction

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INTRODUCTION

BACKGROUND AND OVERVIEW

Students enrolled in public schools have the right to attend safe, secure campuses. Instead, both students and staff too often feel unsafe at school, rather than perceiving school as a safe haven. According to the National Crime Survey, nearly three million thefts and violent crimes occur on or near school campuses every year. This equates to approximately 16,000 incidents per day, or about one every six seconds. Although the number of crimes on school campuses has remained nearly level over the past several years, the crimes are of a more serious nature, children are committing crimes at a younger age, and the frequency of assaults is increasing. Unacceptable and criminal behavior on school campuses is of increasing concern to school administrators, teachers and staff, and parents of school children.

Safe schools issues continue to challenge efforts to provide optimum educational opportunities for children in North Carolina's public schools. Reflecting growing awareness of the magnitude of the issue in schools throughout the nation and the immediate need to further address school safety concerns in North Carolina, the 1997 General Assembly enacted Section 8.29 of Senate Bill 352. The section, entitled Safe Schools, in Part (i) directed the State Board of Education to review and consider modifications to its school facilities guidelines in light of research on the relationship between school design components (especially school size) and school climate and order. The Board is also to develop recommendations to local boards (of education) on modifications to the design or organization of existing schools that will improve school climate and order.

SCHOOL CLIMATE

Nearly all research on school climate is correlational; therefore, no real causal statements can be made about the effects of school climate. Because of the difficulty of collecting data from a limited sample of schools, the need to control a great diversity of student input variables, and the length of time needed for longitudinal studies, challenges to conducting comprehensive research are immense. Even so, examination of the correlation of climate variables with various outcome measures indicates that school climate does make an observable difference.

Halpin and Croft (1963) used an analogy to define organizational climate--that "climate is to the organization what personality is to the individual." They believe that a school's "behavior" as an organization is organized and directed by its individual personality. Various researchers in school climate have built on or modified that perspective by identifying variables that they believe contribute to the overall school climate.

Anderson (1982), in an exhaustive review of the literature, utilized four broad categories to describe dozens of variables constituting school climate. ECOLOGY describes the school's physical environment; MILIEU describes student characteristics, such as socioeconomic status, morale, race, etc. and teacher characteristics, such as education, morale, staff stability, etc.; SOCIAL SYSTEM describes formal structures for how individuals and groups relate to one another, such as administrative leadership, the instructional program, school/community involvement, teacher/student relationships, etc.; and school CULTURE describes the values and belief system within the school, such as teacher commitment to improve student outcomes, student peer norms, academic emphasis and expectations for success by both teachers and students, and discipline within the school.

More specifically, variables which showed positive correlation to school climate throughout the body of research and as organized within the four categories include:

ECOLOGY:

- Physical environment, including building condition and cleanliness

MILIEU:

- Teachers' education and morale
- Staff stability
- Students' morale and "academic optimism"

SOCIAL SYSTEM:

- Instructional program, including high allocated and engaged time and availability of advanced courses
- Principal-teacher rapport and communication; participation of staff in decision making
- Principal activity level as instructional leader
- Positive teacher-student relationships; student involvement in decision making
- Positive teacher-teacher relationships; collegiality
- Student involvement in school activities
- Positive parent/community-school relationships; parent involvement--especially parent-initiated involvement

SCHOOL CULTURE:

- Teacher commitment to improve student achievement
- Student perception that teachers care about them
- Student peer group values academics
- Emphasis on cooperation; competition between groups--not individuals
- Academic emphasis throughout the school
- All in the school expect academic success
- Student achievement recognized
- Orderly and well disciplined; reinforcement of what is right is emphasized

While the foregoing seems to insinuate a proportionately smaller role for facilities as compared to programs in the creation of a positive school climate, the value of facility design, construction, and maintenance to the overall process of education should not be underestimated. Although facilities, in and of themselves, clearly fall under Ecology, they cannot legitimately be excluded from any of the other categories. For example, under MILIEU, both teacher and student morale might be related to the quality, appropriateness, and condition of facilities. Within SOCIAL SYSTEM, the instructional program, student involvement in school activities, and parent/community-school relationships can be related to the designation, quality, and availability of facilities. Clearly, under SCHOOL CULTURE, facilities design can contribute to an orderly and well-disciplined environment.

Dr. Ronald Stephens, in his book entitled *Safe Schools: A Handbook for Violence Prevention*, identifies six broad categories of factors that can contribute to school safety. "Givens" are: (1) personal characteristics of each student and staff member; (2) physical environment of the school; and (3) economic conditions of the community. Those factors that are shaped and improved through planning and action are: (4) social environment on campus; (5) cultural characteristics of staff and students; and (6) local political atmosphere. Stephens identifies a seventh factor that he calls "community will" that may sometimes transcend the other factors in planning, promoting, and achieving safer schools. Stephens specifically notes that a safe school campus is orderly and well maintained, and that facilities and their design can have a major impact on school climate.

Researchers, consulting professionals, and advocating agencies all agree that school facilities constitute one essential facet of a spectrum of ingredients that are critical to a safe and successful school. This publication addresses only the facilities component.

SCOPE

As a supplement to the State Board's *North Carolina Public School Facilities Guidelines*, this document is limited to design-related concepts that can affect school climate and order. While direct reference to the operation and maintenance of facilities is not addressed, their importance to the overall environment within the school should not be overlooked by local school planners. Planning guidelines and recommendations do not distinguish between features for new construction versus modifications to existing facilities, and are appropriate for either.

These planning guidelines are consistent with research findings on school climate and school size covering a period from the early 1960's through 1995. Further, they are consistent with national CPTED (Crime Prevention Through Environmental Design) guidelines for schools and with the North Carolina State Building Code. Content draws significantly from information and materials provided by the North Carolina Center for the Prevention of School Violence, the Florida Department of Education, the National Educational Service, the North Carolina Department of Crime Control and Public Safety, and the North Carolina Department of Public Instruction.

USING THE PLANNING GUIDELINES

Programs and facilities, acting in concert, can contribute significantly to the provision of more secure environments for youth and adults engaged in the educational process. This document contains planning guidelines that are equally appropriate for new construction and for redesign and modification of existing facilities. It is neither comprehensive nor all-inclusive, but provides initial identification of principles around which designs for safer schools may evolve. The planning guidelines in no way supersede state or local codes or regulations or federal or state legislation regarding building design and construction, access, safety, or other pertinent issues.

As a design takes shape, it is likely that additional, more detailed information will be needed about programs, equipment, and purposes that will function within the facility. Staff consultants in various program areas within the Department of Public Instruction are available to discuss topics of concern and may be contacted by phone via the Department's main desk at (919)715-1000. School Planning consultants within the Department may be reached at (919)715-1990.

PLANNING GUIDELINES

These planning guidelines are provided in conjunction with Section 8.29 of Senate Bill 352, as enacted by the General Assembly in 1997. They supplement the State Board of Education's Public Schools Facilities Guidelines established by the School Finance Act of 1987, and may be used by local school units in the design of new construction or the modification of existing public school facilities. This document is provided for guidance purposes and is not intended to establish standards that must be met.

CRIME PREVENTION THROUGH ENVIRONMENTAL CONTROL

Experience has shown a direct relationship between the design and use of school facilities and the occurrence of unacceptable and criminal behaviors. Crime prevention through environmental design (CPTED) principles underlie the concept that proper design and effective use of the physical environment can reduce both the incidence and the fear of crime. A safer environment, in turn, can create a psychological advantage for positive behavior and for learning.

Unacceptable behavior, campus crime and violence can be significantly reduced through the application and interaction of the following seven key components of CPTED.

ACCESS CONTROL

Controlling campus access, either through natural or formal components, is a basic concept of creating a safe school climate. Often, it is the non-student who represents a threat to school safety, rather than students who are enrolled in the school.

Campus Perimeter: Design the campus so that visitors and guests must pass through a particular point or entrance.

Entrances and Exits: Minimize the number of entrances and exits to the campus and direct traffic flow, both vehicular and pedestrian, to eliminate confusion and congestion and to provide ease of observation. Design parking areas to limit and control access.

Visitor Parking: Clearly identify visitor parking with proper signage and set up visitor traffic, both vehicular and pedestrian, in a way that it can be easily supervised from the main office or by assigned security personnel.

Visitor Screening: Clearly worded and placed signage should direct visitors to the main office or designated visitor reception areas where they can be screened, using uniform visitor screening procedures, to ensure that they have legitimate business on campus.

NATURAL SURVEILLANCE

Formal Gathering Areas: Gathering areas should be officially located subject to natural surveillance or access control or located outside the view of the would-be offender. Informal areas then become off-limits and subject to automatic scrutiny. Clear spatial definition will cause unauthorized users to feel at greater risk and encourage staff to assume greater ownership for supervising such areas.

Natural Supervision: Enhance natural supervision by eliminating architectural barriers. Ensure open sight lines through the design and placement of buildings, landscaping components, lighting, and access control.

FORMAL SURVEILLANCE

High-risk and high-incidence areas should be identified through a formal crime reporting process to guide the assignment of appropriate supervision.

High-risk Areas: To the extent possible, design high-risk areas to accommodate natural surveillance and to facilitate formal supervision where required. Such areas may include the main entrance or campus perimeter--especially where problems with intruders are typical. Toilet rooms, corridors, stairways, and locker clusters are often key trouble spots. Commons areas and courtyards frequently have similar problems. Remote locations, such as parking areas, may create additional risks.

Remote Surveillance: Where limited staff availability or a high number of identified problem areas generate a need for other, more formal surveillance options, security specialists should be consulted on the potential use of surveillance equipment, including specifications, placement, operation, and management of the equipment.

TERRITORIALITY

Territoriality is the personalization of space that might be available to any person in order to emphasize the perception of ownership. This translates to the identification of territories within the school campus, assignment of internal territories to "proprietors," and assignment of general supervision and care responsibilities that go with "ownership"of the identified spaces.

Delineation of Space: Space should be clearly delineated throughout the campus to encourage territoriality and better control. For example, it should be clear to anyone when they are moving from the fine arts wing to the science department or to the math department, or from one "house" to another in the lower grades. Smaller spaces may be assigned to individual teachers or staff.

DEFENSIBLE SPACE

Environmental concepts can contribute to the productive management of schools by providing clearly marked transitional zones that indicate movement from spaces designated for public, combined, and private-only use.

Access Points: Reduce access points to parking areas to decrease the perception that they are public spaces, reduce the possible escape routes for potential offenders, and increase the perception that they are risky for the potential intruder. Use gates to close off unnecessary entrances during low-use times to control access and reinforce the perception that the parking areas are private.

TARGET HARDENING

Effective target hardening maintains a balance between the development and implementation of appropriate security measures versus creating an image of a prison or fortress. It must include the vigorous identification, apprehension, and prosecution of criminals, to the end that the school campus becomes unattractive as a site for entertainment or wrongdoing.

Target Hardening: Design facilities with the idea of making the perpetrator's objective difficult to attain and of controlling crime by slowing the perpetrator's progress.

PROGRAM INTERACTION

Effective program interaction can be achieved through a combination of designing facilities that enhance both natural and formal supervision and the development and utilization of a close partnership among law enforcement and emergency service personnel, administration, staff, and students.

Enhanced Natural Surveillance: If necessary, areas where unauthorized infringement might normally occur should be assigned only to activities which are easily supervised. Natural surveillance for these activities will be enhanced through increased perceptions of safety for the legitimate user and risk for the potential offender. Conversely, activities which are more difficult to supervise should be assigned to areas where infringement is typically less likely to occur.

Conflict Reduction: Provide separate entrances and exits to areas that are associated with high-volume use, such as cafeterias and corridors. This serves to reduce time required for movement into and out of such spaces and thereby reduce the opportunity for personal conflict. Separation or differentiation of student traffic flow can help define orderly movement and save time, and the illegitimate user will feel at greater risk of detection.

Communication: Design communication systems to overcome the barriers posed by distance and isolation.

Modifications: Redesign problem spaces and uses of spaces to provide natural barriers to the occurrence of potential conflict. As an example, where congestion and conflict are likely to occur when classes are entering and leaving a cafeteria at the same time using the same entrance, separate the entrance and exit so that different traffic routes are utilized for moving from and returning to instructional areas.

Clear Borders: Provide clearly defined borders for controlled space.

Proper design and use of physical space can affect human decisions and behavior. Successful application of these seven principles can enable the creation of a welcoming educational setting that has by-products of improved safety, productivity, and loss prevention.

SCHOOL SIZE

CONSOLIDATION

The trend to school consolidation which began relatively early in the century continues. Schools and school districts continue to become fewer in number and larger in size. Despite the professional literature which supports educating children in smaller schools, the consolidation trend continues to create larger schools. This trend suggests that such decisions are being driven by considerations other than student welfare, such as political, economic, social, and demographic factors (Cotton, 1996).

American school leadership continues to build large public schools in pursuit of cost effectiveness and curriculum diversity, but may be sacrificing positive school culture and meaningful education reform in the process (Conway, 1994). Decades of research reveal student achievement in small schools to be at least equal--and often superior-- to achievement in large schools (Fowler, 1995; Howley, 1994). Gregory (1992) noted that, "Although it is often assumed that large schools are cheaper to operate and provide richer curricula than smaller schools, studies show that neither of these things is necessarily true. Although research provides ample evidence of the superior social climates of small, informal high schools, these schools have been presumed to have inevitable high costs and program limitations. Such deficits are inevitable only when stuck in the big bureaucracy model of education."

CLIMATE, SAFETY AND ORDER

The issue of school size, as it relates to school climate, safety and order, has been researched extensively over more than five decades, with remarkable consistency of findings. Using a wide range of methods, samples, variables, and hypotheses, most researchers have identified positive correlation of smaller school size to safety, order, or climate. A large body of research into the affective and social realms of schooling affirms the superiority of small schools. Since many small schools are in rural areas, some research has controlled for "ruralness" and revealed that it is the smallness of the school, regardless of setting, that is beneficial to the student (Cotton).

The 1993 National Household Education Survey, conducted for the National Center for Education Statistics, produced the following result: "Students at larger schools are more likely than students at the smallest schools to be exposed to bullying, physical attack, or robbery. A greater percentage of students at schools containing 600 or more students than those attending schools of fewer than 300 students reported knowledge of crime or threats at school and witnessing crime." *The Annual Report on School Violence: 1995-96*, published by the North Carolina Department of Public Instruction, noted that disproportionately more reported incidents (of violence) occurred in the largest schools, regardless of grade level. The report revealed that

"this effect was greatest for large elementary schools (of 750 students or more) and large high schools (of 1,500 students or more), where the percent of incidents in such schools was approximately double what would be expected of these schools by chance alone." Schwartz (1996) proposed downsizing schools as a school reform, noting that it has been widely documented that smaller schools have fewer disruptions and incidents of violence.

Safety and order in the school seem inextricably interrelated with school climate. Definitions of school climate abound, but much of the research identifies two major areas of influence--student feelings, attitudes, and social behavior; and school administrator and teacher attitudes.

Student Feelings, Attitudes, and Social Behavior

In studying the relative effects of large and small schools on student attitudes toward school in general and toward school subjects in particular, Fowler (1995), Howley (1994), and Rutter (1988) found that the evidence overwhelmingly favors small schools. Additionally, compared to students in large schools, both the personal and the academic self-concepts of students in small schools are more positive (Rutter, 1988; Stockard and Mayberry, 1992).

Research also indicates that students in small schools experience a much greater sense of belonging, which is sometimes expressed as a lower level of alienation (Fowler and Walberg, 1991; Gregory; Stockard and Mayberry). A related finding is the higher quality of interpersonal relations found in small schools (Fowler and Walberg; Rutter). Cotton, Fowler, and Stockard and Mayberry found that students participate in extracurricular activities at significantly greater levels in small schools than in large ones, and are also more likely to participate in a greater variety of activities and hold important positions in the activities in which they are involved. Research has consistently shown that attendance of smaller high schools leads to increased participation in extracurricular activities (Barker and Grump, 1964; Grabe, 1976, 1981; Holland and Andre, 1987; Lindsay, 1982; Morgan and Alwin, 1980; Schoggen and Schoggen, 1988) and that participation in activities and positive self-esteem are also correlated in such schools.

Students in small schools have higher attendance rates than those in large schools. With regard to dropouts, the holding power of small schools is considerably greater than that of large schools (Fowler; Fowler and Walberg; Rutter).

School Administrator and Teacher Attitudes

While much of school size research has focused on students, studies have been conducted on administrator attitudes toward work; teacher attitudes toward work, administration, and one another; and incidences of cooperation and collaboration among colleagues. The research on teachers and administrators favors small schools (Gottfredson; Gregory; Stockard and Mayberry).

Gottfredson (1985) noted that "Large schools appear to promote negative teacher perceptions of school administration and low staff morale." Change can be implemented more quickly in smaller schools, where layers of bureaucracy are reduced (Tadlock and LoGuidice, 1994).

SCHOOLS WITHIN SCHOOLS

Some schools-within-a-school efforts, in which large schools are divided into sub-units, have been initiated in an attempt to garner at least some of the benefits of smaller schools. In Philadelphia and New York, for example, independent studies agree on the importance of large buildings containing multiple units, with no "regular" or "host" school holding the small ones to "guest" status in the building.

The growing body of research on schools-within-a-school suggests the potential for producing results like those associated with small schools, provided they are distinct administrative units within the buildings that house them (Cotton). Raywid (1985) noted that "The major challenge to schools within schools has been obtaining sufficient separateness and autonomy to permit staff members to generate a distinctive environment and to carry out their own vision of schooling."

SCHOOL SIZE

There is no universal agreement on the ideal size for schools. Indeed, schools should reflect the nature and requirements of the communities served. For example, research shows that higher percentages of economically disadvantaged or minority students in a student body should precipitate a reduction in school size (Cotton; Fowler; Howley; Lee and Smith, 1996). What is clear from the research, however, is the positive relationship between smaller school size and a number of variables associated with school climate and order.

On average, this research (Williams, 1990; Howley, 1996) indicates effective school sizes to be:

Elementary:	300-400 students
Middle:	300-600 students
High:	400-800 students

Researchers also agree that these estimates push the upper limits, since many investigators conclude that no school should have more than 400-500 students (Cotton).

The State Board of Education's facilities guidelines identify preferred school sizes, based on recommended square footage per student as a factor of estimated economy of construction, operation, and maintenance. Those size ranges are:

Elementary:	450-700 students
Middle:	600-800 students
High:	800-1200 students

The local school unit must determine school sizes that best serve its purposes. Often, size designation is a compromise among objectives for student achievement, student and staff safety, and effective and efficient utilization of fiscal resources.

SITE

1. Hazardous entrances off main thoroughfares should be avoided. If possible, lanes into and out of a campus should be separated by a landscaped median.

2. Auto and bus traffic should be separated upon entry onto school property.

3. Landscaping, entries, screen walls, or building corners that block the vision of drivers entering or leaving school property should be avoided.

4. To decrease potential hazards to pedestrian traffic, bus parking should not be located so that buses have to back up to turn or park, nor should buses be parked in double rows.

5. Long, straight layouts for parking lots, especially those used by students, should be avoided in order to reduce vehicle speeds and lower risk to pedestrians. Traffic control devices, such as speed bumps, can greatly reduce the potential for high-speed vehicular activity. Raised sidewalks can double as speed bumps where pedestrian traffic merits.

6. Unloading areas for students should not be located so that children have to negotiate traffic.

7. Pedestrian traffic patterns in areas of vehicular traffic should be designed to minimize potential risks. Where students must cross drives, raised sidewalks should double as speed bumps and traffic should be one-way only.

8. Drives that completely encircle a building or which have to be crossed when moving between buildings or to playgrounds or athletic fields are hazardous and should be avoided.

9. Adequate campus access and circulation for emergency service personnel and vehicles should be ensured. Fire department vehicle access lanes that extend beyond parking lots or service drives should be avoided, due to potential hazards to pedestrians. If access lanes are required by local code, they should be constructed as wide sidewalks or grassed hardened surfaces. Vehicular access should be over the curb, rather than via curb cuts which could encourage unauthorized use.

10. Avoid locating facilities near electric power transmission line easements that cross or border school property. All facilities and site functions (except drives) should observe the following minimum clearances:

100-110 kv line:	100 feet from easement
220-230 kv line:	150 feet from easement
345 kv line:	250 feet from easement

11. Noise levels that are generated by on-site mechanical equipment or nearby industries or transportation systems can interfere with communication or create a hazard to hearing and should be avoided.

12. To reduce potential injury from industrial accidents, avoid locating schools near industries that utilize hazardous materials or processes or that generate hazardous by-products or discharges.

13. Pre-kindergarten and kindergarten classes should have shared play areas separate from areas for older children. To avoid trapping children during emergency egress from buildings, perimeter walls or fences may not exceed 32 inches in height if gates are lockable.

14. Playground equipment with sharp edges, rough surfaces, or hazardous projections that may entangle clothing or cause injury should be avoided. Additional guidelines for play equipment are outlined in *The School Site: Land for Learning* (1996, North Carolina Department of Public Instruction).

CIRCULATION

1. Minimum recommended corridor widths are:

Major corridors*	Elementary and middle: 10'-0"
	* High: 12'-0"
Serving more than two classrooms:	8'-0"
Serving more than eight classrooms:	9'-0"

For lockers along one wall, add 2'-0" of width. For lockers along both walls, add 3'-0".

(* Major corridors serve classroom feeder corridors and large-group spaces such as cafeterias, media centers, gymnasiums, multipurpose rooms, and auditoriums.)

2. Doors which open into corridors must be recessed or protected by wing walls so that no part of the door swing projects into the circulation path by more than seven inches.

3. Multiple single doors reduce congestion and are recommended, rather than double doors.

4. Oversize doors accommodate movement of equipment and supplies and are recommended for exceptional children entries and for music, workforce development, kitchen, and receiving areas.

5. During class changes, corridors also serve as commons areas. Spacious corridors may reduce undesirable behavior.

6. To reduce injuries from falls, single stair runs should not exceed 8'-0" without a landing.

7. Minimum stair width for grades 6-12 should be 6'-0".

8. For efficiently moving large numbers of students, additional sets of stairs may function more safely and effectively than very wide stairs.

9. Wire-glassed openings should be used for visibility in fire-rated doors along main egress routes.

CLASSROOMS AND LABORATORIES

1. Provisions for two-way communication to the administrative or security offices should be provided in all occupied areas, including relocatable classrooms.

2. To enhance safe movement during power interruptions, daylight sources should be provided in locker rooms and in laboratories containing hazardous equipment.

3. Light switches for toilets and corridors should be keyed or located in remote locations not accessible to students.

4. Fluorescent lighting should not be used where it may adversely affect children with certain disabilities.

5. Fire extinguishers should be located in all laboratory areas.

6. Heat-producing appliances should be avoided in elementary classrooms and should be controlled via a "kill switch" with pilot light in middle and high schools.

7. Circuits for hazardous machines and tools, to include counter receptacles in kitchen areas, should be controlled via "kill switches" with pilot lights.

SUPPORT AREAS

1. To address potential liability and safety issues, a vision panel with blinds should be provided in guidance offices and other areas where one-on-one adult/child conferencing is conducted.

2. For supervision of clients, a vision panel with blinds should be provided in health rooms.

3. To prevent a client's being trapped upon becoming incapacitated while in a toilet, toilet room doors in health rooms should swing outward into the main room.

4. To eliminate the potential for accidental falls, orchestra pits should be avoided. Several rows of removable seats at the front of an auditorium should be considered as an alternative.

5. To eliminate potentially serious injuries from falls, fly lofts or working stages are discouraged.

6. Dance classrooms should utilize suspended wooden floors or floor covering systems which provide adequate resilient surfaces.

7. Mirrors in dance classrooms should be shatterproof.

8. To eliminate the potential for accidental falls, storytelling pits in media centers should be avoided. Removable, carpeted risers should be considered as an alternative.

9. To enhance player and spectator safety, safety borders should be provided around basketball courts--a minimum of six feet wide along the sides and eight feet wide on the ends. Walls or protrusions at the ends of courts may require padding, where safety borders are too narrow.

10. Permanent stairs, with security features which prevent unauthorized use, should be provided to mezzanine or roof areas where mechanical equipment is located.

11. A well-ventilated storage area (preferably in a separate building) should be provided for the storage of equipment and materials that pose a combustion hazard. A two-hour fire separation is required by state building code.

12. To enhance surveillance, locker rooms and shower areas should be visible from inside gym teachers' offices.

13. To reduce fire and toxic hazards, kilns should be located in separate rooms with adequate exhaust and ventilation. Kilns should not be located in storage rooms where materials other than clay products are stored.

14. Group toilet rooms should utilize screen walls to eliminate the need for entry doors.

SITE

1. Edges of school property can be defined with appropriate tree plantings and other landscaping elements. Careful design can maintain ample sight lines for effective surveillance. In urban settings where fences are used to border property, such plantings can soften edges while communicating to the public the message of privacy. Uninviting neighborhood development can be screened and intrusive noise softened, while discouraging unwanted visitors. In more rural settings, landscaping can be used to create visual lines that define boundaries without the use of fences.

Tree canopies should be maintained at a minimum height of eight feet and hedges should be kept low enough not to provide places where people can hide. Landscaping should never prevent visual access into school property.

2. A less stressful, healthier, and safer school environment can be achieved through thoughtful, well-designed landscaping. Trees can provide shade and protection from the wind to people and structures, and act as visual and noise buffers. Large tree canopies have a tremendous capacity to absorb high-speed wind energy from hurricanes and other storms. Absorption of high decibel levels of noise before it reaches the hub of the school campus makes verbal communication and surveillance easier.

Tree species that will resist winds should be selected. Species that could split off in a storm, causing additional hazards, should be avoided.

3. Landscaping can serve to control and direct traffic just as well as walls or fences. Trees lining sidewalks or drives can give natural direction to pedestrian and vehicular traffic, while limiting or denying access to identified sections of the campus.

4.Covered walkways between buildings should be bordered by low shrubs and hedges, not to exceed 18 inches in height. Taller hedges should be placed and maintained in such a way as to prevent someone from hiding behind them.

5. Shaded areas should be provided for students waiting for buses, in order to offer protection from undesirable climate or weather..

6. Walkways and corridors that serve student drop-off areas should be wide enough to accommodate peak periods of use and reduce the unwanted effects of crowding.

7. Vehicular routes and parking areas should be in visual proximity to strategic sections of buildings, such as administration and classrooms, and should be adequately lit using vandal-proof lighting.

8. If two entries to a campus are needed, they should be close enough to each other to allow one individual to monitor both.

9. To reduce the possibility of vandalism and other undesirable behavior, avoid the use of loose gravel or crushed rock for surfacing.

10. Outdoor facilities, such as athletics or recreational fields, should be organized around a single axis to facilitate immediate visual surveillance of the entire area. School buildings placed on higher elevations than such facilities provide better opportunities for observation. On flat sites, vantage points should be identified or constructed to allow unobstructed visual surveillance.

11. Signs should have large lettering, bold graphics, simple directions, and be well lit. In order that signs not provide hiding places for people, the ground behind a sign can be bermed up or the sign can be raised high enough off the ground to expose the feet of a person hiding behind it.

12. Bicycle racks should be located in highly visible areas near a main entry or parking area, but with clear separation from vehicular traffic.

13. Where walls project, dark niches where people can hide are created. The planting of low hedges and the provision of nearby windows or recessed exterior lighting can reduce the improper use of such spaces.

14. Walls in graffiti-prone locations should be of a material and finish that can repel graffiti or tolerate repeated cleanings.

15. Screen walls of metal or decorative blocks should provide no footholds, and the top three to four feet nearest the roof should be smooth and unclimbable.

16. Exterior mechanical equipment enclosures should utilize designs and materials which make climbing difficult and provide side protection from thrown projectiles. Access doors should be solid, with concealed hinges and deadbolt locking.

17. Dumpsters should be secured and enclosed to prevent persons from climbing inside to play or hide. Eight-foot-high screen walls, constructed to minimize climbing, should surround three sides. Any gate should be lockable and should provide visual access to the inside of the enclosure.

CIRCULATION

1. Exterior covered walkways should be designed to prevent access to adjoining windows, roofs, or other upper-level areas, and to promote adequate illumination and visual surveillance. Support columns should be made of a smooth, difficult-to-climb material. Trees should be planted away from buildings and covered walkways to prevent access to such structures. "T" connections should be provided at entries to avoid creating building niches and to provide clear sight lines and circulation paths unobstructed by doors or loitering students.

2. The main point of entry should be at the front of school buildings and should provide a safe, well-lighted, protected shelter for those entering the building. Sufficient windows and glazed doors should be provided to facilitate visual surveillance from strategic areas, such as administration or the visitor reception desk.

Secondary entries should be recessed for protection from the weather, but should not provide places for people to hide. Completely hidden alcoves which shield doors and stairs from weather can also serve as concealed areas for untoward activity. Visibility into alcoves can be enhanced by the use of chamfered wall corners and adequate glazing and lighting

3. Enclosed exterior courtyards should permit visual supervision by one individual.

4. Corridors should be broad and well lighted, with no projections. Sudden 90-degree turns and narrow hallways should be avoided. Smoother traffic flow and better visibility should be provided through the use of chamfered wall corners.

5. Door niches on hallways should be chamfered and wide enough to provide clear lines of sight down hallways. Windows should be provided in or near classroom doors to allow staff to monitor hall traffic.

6. Alcoves along corridors for locating items such as lockers, vending machines, trash containers, and water coolers should be avoided, in order to eliminate difficult-to-supervise hiding places or spaces that promote undesirable activity. Such items should be either low profile in design or mounted flush with corridor walls. Lockers which are single height, as opposed to an over-and-under configuration, reduce undesirable crowding during periods of heavy congestion.

7. Stairs should be well lighted. Enclosed stairwells should have electronic surveillance equipment to provide motion detection at main access points and on landings. The entire area under all stairs should be enclosed and unavailable for any use.

8. Stair handrails should be constructed so as to provide visual access from either side of the stairs. (Solid handrails can provide hiding places on stairs and landings.) Handrails should be designed to discourage sliding on them and horizontal rails should incorporate vertical supports that discourage climbing.

9. Risers should be enclosed on the sides to prevent persons from grabbing the ankles of others using the stairs.

10. Fixed metal detectors can greatly reduce the incidence of weapons being brought into the school building. A modest, inconspicuous detector should help avoid bringing attention to the problem and the process.

11. Access to elevators should be limited to authorized individuals. Elevators should be located in lobbies or other areas with higher-than-normal natural surveillance. A five-foot-deep landing area should minimize obstruction of student traffic. Video surveillance of and into elevators can significantly deter criminal or other undesirable activity.

12. Water fountains and toilet rooms should be located in gathering areas that are typically monitored.

13. Vending machines should be located adjacent to or inside cafeterias or other well-monitored spaces, rather than in isolated areas.

14. Standpipe cabinets and fire extinguishers in main corridors should be flush mounted.

15. Lighting should be located so as to minimize the creation of dark or shadowed recesses that might be conducive to undesired activity.

16. Circulation areas should be designed and sized to avoid overcrowding during times of peak congestion.

CLASSROOMS AND LABORATORIES

1. Relocatable classrooms should be sufficiently separated from each other and permanent structures to permit visual surveillance. In order not to provide hiding places for people, spaces underneath relocatables should be secured with chain link fencing or a similar material that can prevent access and maintain visibility.

2. Narrow windows or sidelights around doors allow for seeing who is on the other side before opening a door and to observe adjacent spaces. Where such windows are used, door hardware and glazing products should be used that will deter unauthorized entry through breakage of the glass.

3. Operable transom windows are not recommended for use over exterior doors.

4. Interior door recesses should be top-lighted and chamfered to eliminate dark corners.

5. Classrooms should be organized for ease of monitoring by staff. Visual access to the corridor, and in some instances to the building's exterior, is desirable.

6. Retractable partitions should contain windows or provide other visual access into adjoining spaces, and should be stored in permanent, lockable niches.

7. Two-way communication to administrative or security offices should be provided from all occupied areas, including relocatable classrooms.

SUPPORT AREAS

1. Administration areas should be contiguous with main entries, with easy visual access into and from the area.

2. Health rooms should include locked storage for equipment and supplies.

3. Locker rooms should be arranged for easy surveillance, with instructors' offices positioned near main entries and exits to provide visual access to locker areas.

4. Free-standing or island lockers should be adequately spaced to avoid student crowding. Lockers should not exceed four feet in height, in order to permit visual surveillance. Perimeter lockers should be mounted flush to the walls to minimize opportunities to hide on top of them or to attempt access to ceiling areas.

5. Mirrors, windows, and light covers in toilet and locker rooms should be impact resistant.

6. Ceilings in toilet rooms and locker areas should be made of exposed concrete, plaster, or double-thickness drywall, rather than accessible materials such as lay-in tiles, to prevent the use of the spaces above as hiding places for persons or stolen property.

7. Control points and clear sight lines in the media center should be used to minimize opportunities for theft or creating hiding places.

8. The reception area or circulation desk in the media center should be located to facilitate the monitoring of student traffic into and out of the facility.

9. Interior media stacks should be a maximum of four feet in height, well-spaced, and visually accessible from strategic locations.

10. Skylights or clerestory windows on roofs should be tamper-proof and should be positioned well clear of any means of climbing down to the rooms underneath.

11. Large assembly areas, such as auditoriums, should provide clear sight lines and easy traffic flow. Niches along walls should be avoided and folding partitions should recess fully into walls to eliminate barriers behind which people can hide.

12. Single, designated control points with clear sight lines should be positioned near the entrances and exits to cafeterias.

13. Avoid overcrowding and promote efficient traffic flow in cafeterias by providing ample space between serving counters and between dining tables.

14. Locate toilet rooms directly adjacent to main corridors in order to maximize visibility and surveillance.

15. Large-event toilet rooms should provide secondary access and should remain locked or should be reduced in size during normal school operation. Hardware should permit doors to be locked in the open position for use during designated events.

16. Group toilet rooms should not have doors, in order to provide acoustic surveillance from adjoining corridors.

17. Toilet partitions should be structurally sound and attached at floor, wall and ceiling. Partition walls should not exceed 5'-6" in height and should have a 1'-0" clearance above the floor to allow visual surveillance.

18. Toilet room hand dryers, vending equipment, and trash containers should be heavy duty, recessed, fire resistant, and lockable.

19. Retractable gymnasium bleachers should be capable of being locked in place when not in use, to prevent persons from hiding or engaging in undesirable activity in the space underneath.

20. While stage curtains can be left open to allow visual surveillance, electrical and lighting controls for an auditorium should be located in a locked panel or room.

21. Designs for areas in which there will be large congregations of students, such as music or band rooms, should support visual supervision of an entire area by one individual.

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